

**WCT410 Series**  
**Bleed, Feed and Dual Biocide Cooling Tower Conductivity Controllers**  
**Revised 11/3/2008**

**Part 1. General**

**1.1 Scope**

- A.** This section describes the requirements for a bleed, feed and dual biocide cooling tower conductivity controller with an automatically temperature compensated electrode.
- B.** Under this item, the contractor shall furnish and install the conductivity control equipment and accessories as indicated on the plans and as herein specified.

**1.2 Submittals**

- A.** The following information shall be included in the submittal for this section:
  - 1. Data sheets and catalog literature for a micro-processor based bleed, feed and dual biocide cooling tower conductivity controller and electrode.
  - 2. Interconnection and dimensional drawings.
  - 3. List of spare parts

**Part 2. Products**

**2.1 Bleed, feed and dual biocide cooling tower conductivity controller**

- A.** The bleed, feed and dual biocide cooling tower conductivity control system shall consist of a control module that provides on/off conductivity control, inhibitor chemical feed, two biocide chemical feeds and a conductivity electrode that provides measurement of the conductivity, as well as a temperature measurement for automatic compensation for errors due to temperature fluctuations.
- B. Control Module:**
  - 1. Enclosure: Polycarbonate, NEMA 4X, lockable hinged door with clear window.
  - 2. Power: 100-240 VAC, 50/60 Hz, 8A Fuse: 1.0 ampere, 5 x 20 mm

3. Inputs:
  - Conductivity: 0 to 10,000  $\mu\text{S}/\text{cm}$ .
  - Temperature: 10 K Thermistor
  - No Flow Interlock: Isolated dry contact closure (reed switch)
  - Water meter contactor: Isolated dry contact closure (reed switch).
4. Outputs:
  - Control (on/off): Four internally powered relays, 6 A (resistive), 1/8 HP. All relays are fused together as one group, total current for this group must not exceed 6A
  - Alarm: One internally powered relay, 10 A (resistive), 1/8 HP
  - 4 – 20 mA (Optional): Fully isolated, internally powered, 600 ohm maximum resistive load.
5. Software features:
  - Control relay shall feature adjustable control direction and dead band.
  - Chemical feed shall be selectable from bleed and feed, feed as a percentage of bleed, feed as a percentage of time, and feed based on a water meter contactor input.
  - Biocide feed shall be selectable from up to 10 times per day, a weekly cycle, a two week cycle, or a 28 day cycle.
  - A self test shall be available to verify the integrity of the control module's sensor input circuitry.
  - Manual activation of the relays shall be easily accomplished via the keypad.
  - A maximum output on-time shall be available on the bleed and feed relays to prevent runaway control.
  - Software upgrade file shall be transferable to the controller via USB memory stick
  - Optional datalog of conductivity, temperature and water meter totals in 10 minute increments over a two-month period
  - Optional event log with time-stamped relay on/off and flow/no-flow events
  - Optional configuration file import/export feature

**C. Sensor:**

1. Operating Principle: The conductivity sensor shall be driven with a low voltage AC signal, and the return signal voltage will vary with the conductivity of the intervening solution.

The 10 K ohm temperature signal shall also be delivered to the control module, in order to automatically compensate for sensor errors due to temperature fluctuations.

2. Materials of construction: PVC, Glass filled polypropylene, FKM and graphite.
3. Process connections: For in-line sensors, 3/4" NPT Female.
4. Temperature range: 0 – 60 degrees C.
5. Pressure range: 0 – 150 psig.

**D. Controller and Sensor Performance**

1. Range: 0 – 10,000  $\mu\text{S}/\text{cm}$ .
2. Accuracy: From 10-10,000  $\mu\text{S}/\text{cm}$   $\pm$  1% of reading; from 0-10  $\mu\text{S}/\text{cm}$   $\pm$  20% of reading.
3. Resolution:  $\pm$  1  $\mu\text{S}/\text{cm}$ .
4. Maximum separation between the controller and the sensor shall be 250 feet.

**E. Indication**

1. Graphic User Interface

A 2 line x 16 character backlit LCD display shall indicate the process value, a bar graph of the process value relative to set points, and the status of outputs and alarms.

Five LED lamps shall indicate the on/off status of the control outputs.

**F. Equipment**

The bleed, feed and dual biocide cooling tower conductivity controller shall be a Walchem WCT410 series.

## **Part 3. Operator Functions**

### **3.1 Calibration**

- A.** The conductivity electrode calibration shall be a one point calibration, utilizing a solution of a known conductivity.
- B.** All set points shall be set through the 8 button keypad.
- C.** An access code shall be available to protect all set points and calibrations, while allowing the user to view any set point.

### **3.2 Control Module Function Details**

- A.** The conductivity control output shall be on/off control with adjustable dead band.
- B.** The conductivity control direction shall be selected via the keypad.
- C.** The inhibitor chemical feed output shall be on/off control with four choices of feed modes.
- D.** The bleed and feed relays shall have limit timers to prevent runaway control.
- E.** The biocide programs shall provide a conductivity based prebleed prior to the biocide addition, and a time based lockout of the bleed after the biocide addition.

## **Part 4. Execution**

### **4.1 Installation**

- A.** The sensor shall be installed in a location where it will always remain immersed in the sample.
- B.** The sensor shall be installed in a location where there is good solution movement and where it will respond rapidly to conductivity changes.
- C.** The sensor cable shall be routed such that it is separated from any AC voltage by at least 6 inches.
- D.** If the sensor cable needs to be extended beyond the standard 10 feet, then 24 AWG, 2 twisted pair, shielded cable shall be utilized.

- E. If the optional 4 – 20 mA output, water meter contactor or flow switch are installed, then 22-26 AWG, twisted pair, shielded cable shall be utilized.
- F. The sample line shall be tapped from the discharge side of the cooling tower recirculation pump, and returned to either the cooling tower sump or the suction side of the recirculation pump.

## **Part 5. Warranty**

### **5.1 Terms**

- A. The manufacturer of the above specified equipment shall guarantee equipment of its manufacture, and bearing its identification to be free from defects in workmanship and material for a period of 24 months for electronics and 12 months for mechanical parts from date of delivery from the factory or authorized distributor under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by the manufacturer and for the purposes disclosed in writing at the time of purchase, if any.
- B. In the event a component fails to perform as specified and having been returned to the manufacturer transportation charges prepaid, and is proven defective in service during the warranty period, the manufacturer shall repair or replace the defective part. Replaceable elastomeric parts and glass components are expendable and are not covered by any warranty.

## **Part 6. Options**

### **6.1 Related Equipment**

- A. 191007 flow switch manifold assembly
- B. Solenoid valve for bleed control
- C. EHB16R1-VC metering pumps for chemical feed
- D. Water meter contactor
- E. 100084 Sensor extension cable

## **Part 7. Spare Parts**

### **7.1 Recommended Spare Parts**

- A. 103163 Fuse, 1 A, 250 VAC
- B. 102864 Fuse, 6 A, 250 VAC

**Measurement Performance**

Conductivity Range	0-10,000 $\mu\text{S}/\text{cm}$
Resolution	1 $\mu\text{S}/\text{cm}$
Accuracy	10-10,000 $\mu\text{S}/\text{cm} \pm 1\%$ of reading 0-10 $\mu\text{S}/\text{cm} \pm 20\%$ of reading
Temperature Range	32-158°F (0 to 70°C)
Resolution	0.1 degree
Accuracy	$\pm 1\%$ of reading

**Inputs**

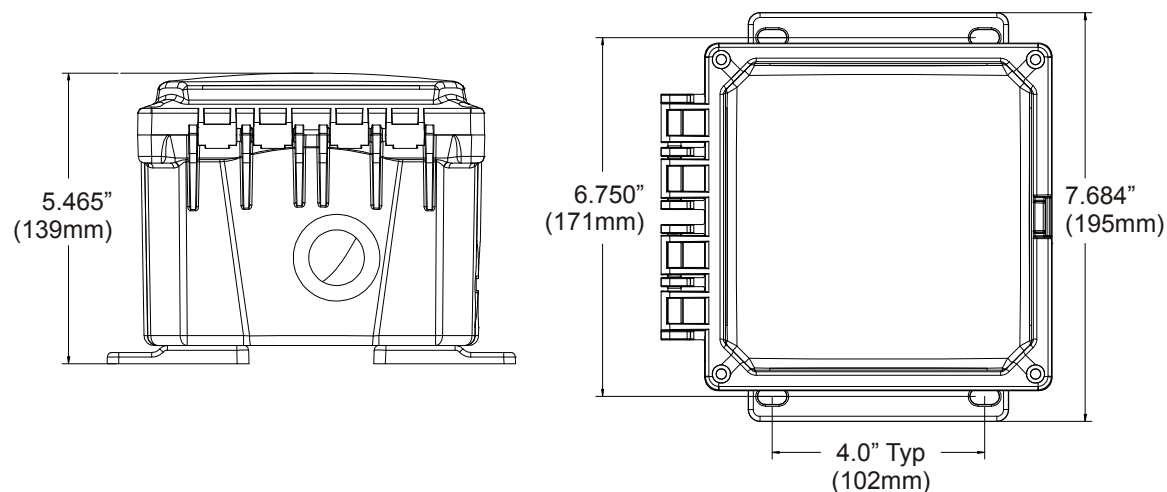
Power	100-240 VAC, 50/60 Hz, 8A Fuse: 1.0 ampere, 5 x 20 mm
Signals	(Optional) Flow Meter-isolated, dry contact closure required (relay reed switch) (Optional) Flow Switch-isolate, dry contact closure required (reed switch)

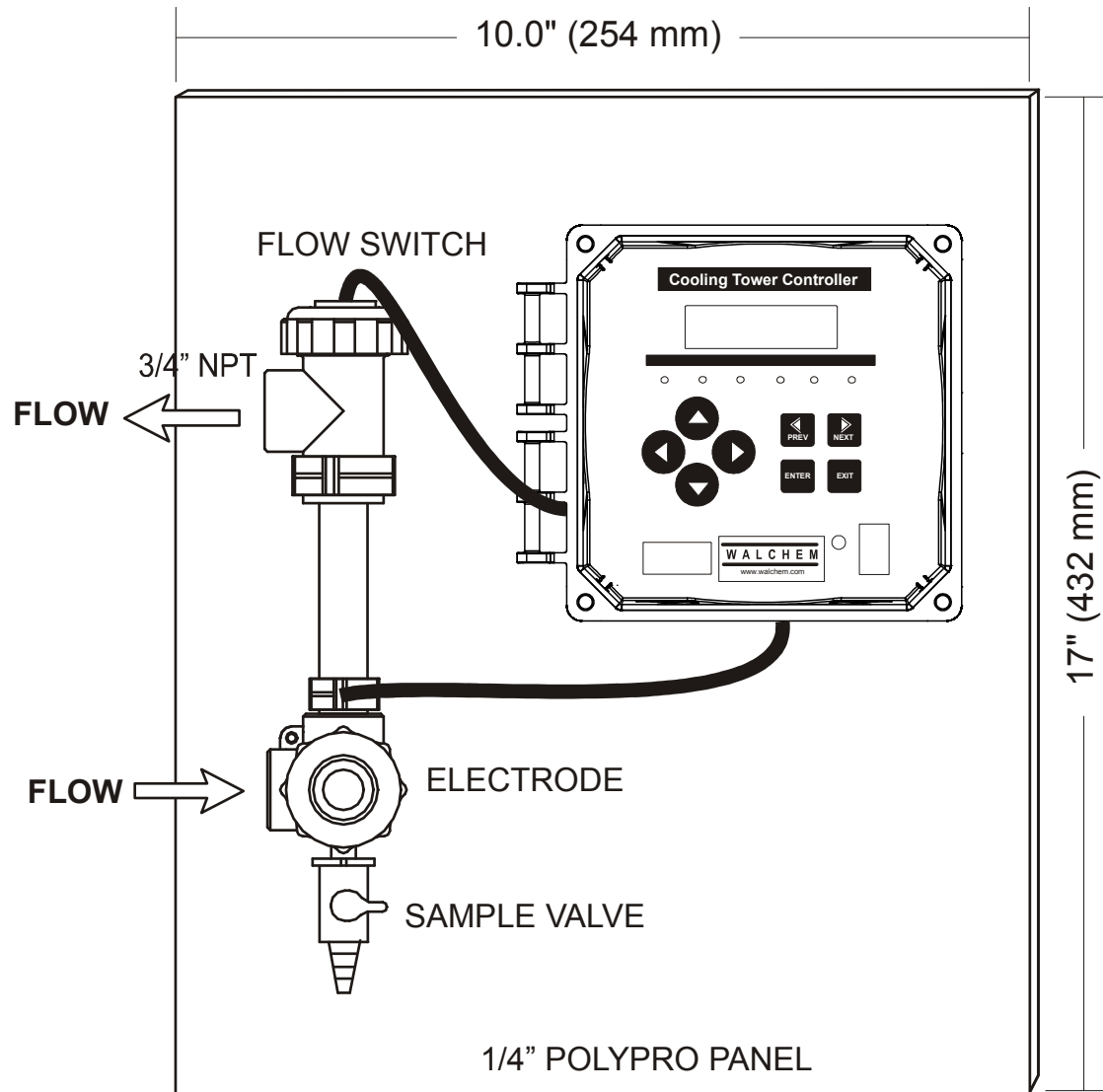
**Mechanical**

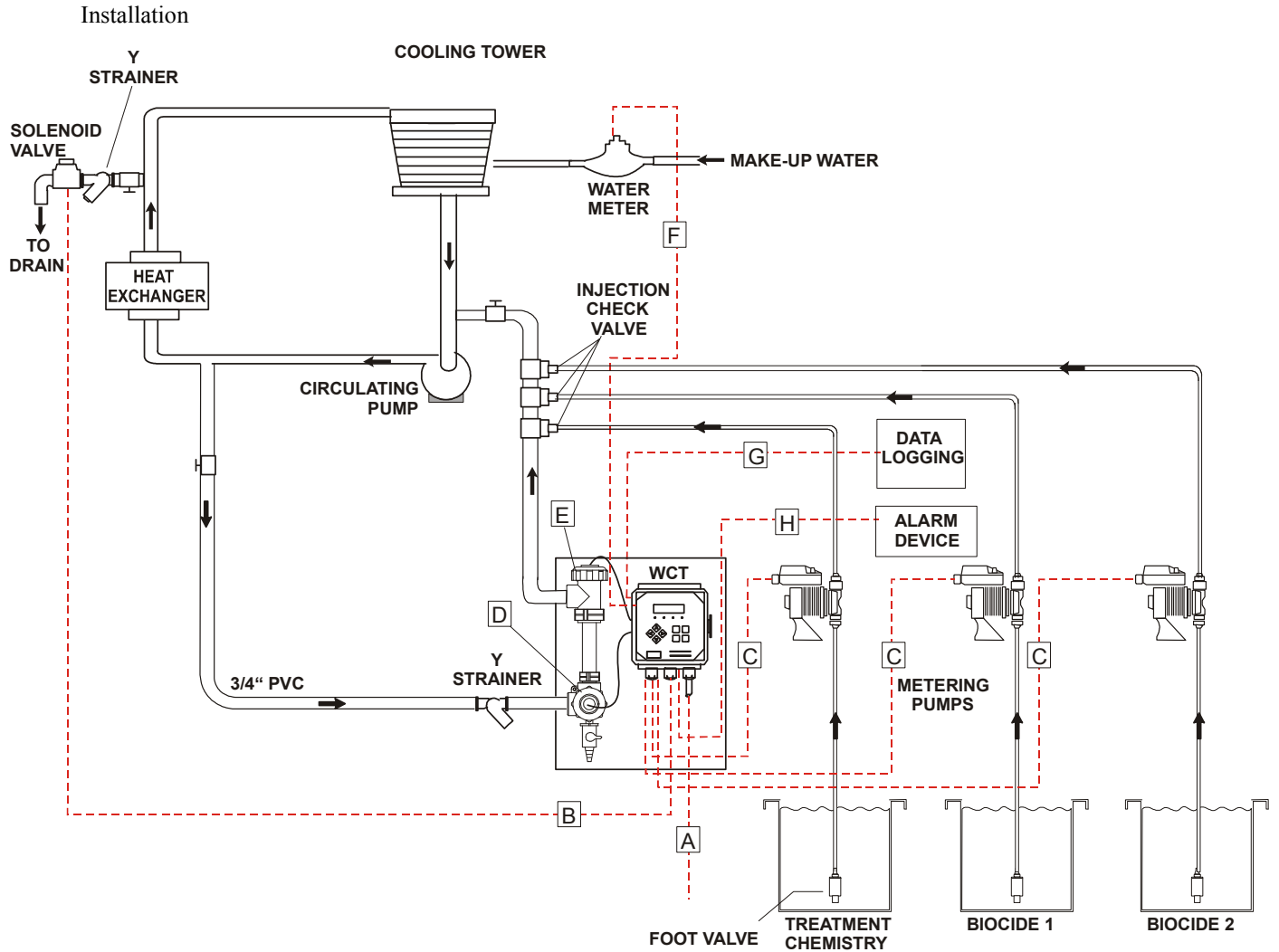
Enclosure	Polycarbonate
NEMA rating	NEMA 4X standard
Dimensions	See below
Display	2 x 16 character backlit liquid crystal
Ambient Temp.	32-158°F (0-70°C)
Shipping wgt.	10 lbs (approximately)

**Outputs**

Mechanical Relays	6A resistive, 1/8 HP All relays are fused together as one group, total current for this group must not exceed 6A Fully isolated, internally powered 600 $\Omega$ max. resistive load. Resolution 0.001% of span, accuracy $\pm 1\%$ of reading
4-20mA(Optional)	

**Dimensions**





A	AC POWER, 8 AMPS MAXIMUM, 2 x 18 AWG PLUS GROUND OR LOCAL CODE
B	AC POWER, 6 AMPS MAXIMUM, SOLENOID, 2 x 18 AWG PLUS GROUND OR LOCAL CODE
C	AC POWER, 6 AMPS MAXIMUM, METERING PUMP, 2 x 18 AWG PLUS GROUND OR LOCAL CODE
D	CONDUCTIVITY ELECTRODE, 4 x 24 AWG PLUS SHIELD, 5 FT SUPPLIED
E	FLOW SWITCH, 2 x 24 AWG PLUS SHIELD, 5 FT SUPPLIED
F	OPTIONAL WATER METER, 2 x 24 AWG PLUS SHIELD
G	OPTIONAL 4-20mA OUTPUT, 2 X 24 AWG PLUS SHIELD
H	AC POWER, 6 AMPS MAXIMUM, ALARM, 2 x 18 AWG PLUS GROUND OR LOCAL CODE



## WCT Series, Bleed & Feed Controller with Biocide Additions Ordering Information

**WCT400 or 410** -



VOLTAGE   OUTPUT   SENSOR   USB

### VOLTAGE

1 = 120 VAC, prewired

5 = 100-240 VAC, hardwired, cable glands

### OUTPUT

N = No data output

4 = Isolated 4-20 mA output

### SENSOR

N = No electrode

1 = PP/Graphite electrode & tee, 20ft. (6.1m) cable (for in-line or submersion mounting)

2 = PP/Graphite electrode & flow switch manifold mounted on PP panel, 5 ft. (1.5m) cable

4 = High pressure electrode (up to 300 psi), 20 ft. (6.1m) cable

5 = High pressure electrode & flow switch manifold on PP panel, 5 ft. (1.5m) cable

6= PP/SS electrode & tee, 20 ft. (6.1m) cable

7= PP/SS electrode & flow switch manifold on PP panel, 5 ft. (1.5m) cable

### USB FEATURES

N = Software upgrade capability only

U = Integrated datalogging, event/reset logging, and configuration file import/export

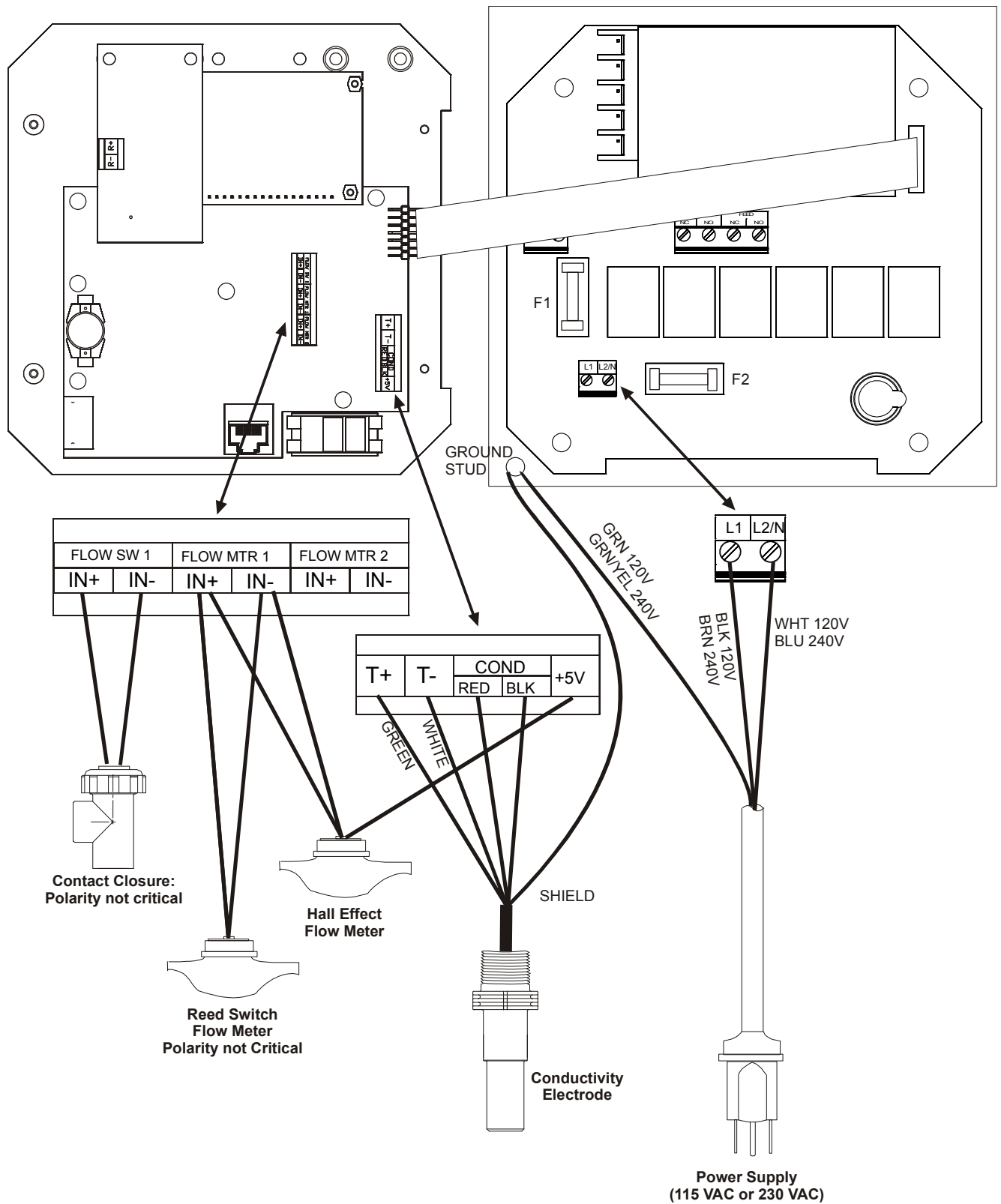
## Safety Approvals

### Agency Approvals

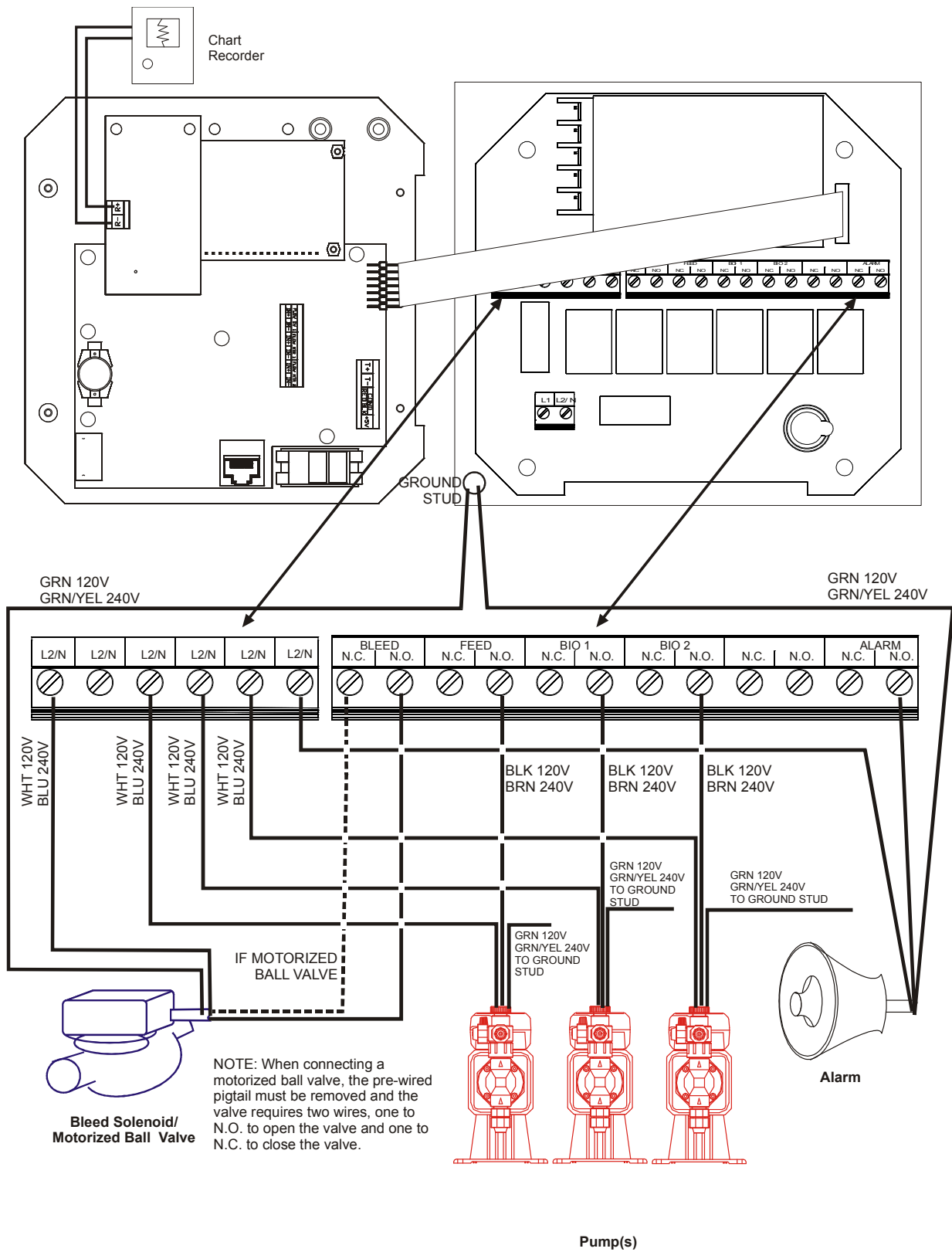
UL	ANSI/UL 61010-1:2004, 2 <sup>nd</sup> Edition*
CAN/CSA	C22,2 No.61010-1:2004 2 <sup>nd</sup> Edition*
CE Safety	EN 61010-1 2 <sup>nd</sup> Edition (2001)*
CE EMC	EN 61326 :1998 Annex A*

Note: For EN61000-4-6,-3 the controller met performance criteria B.

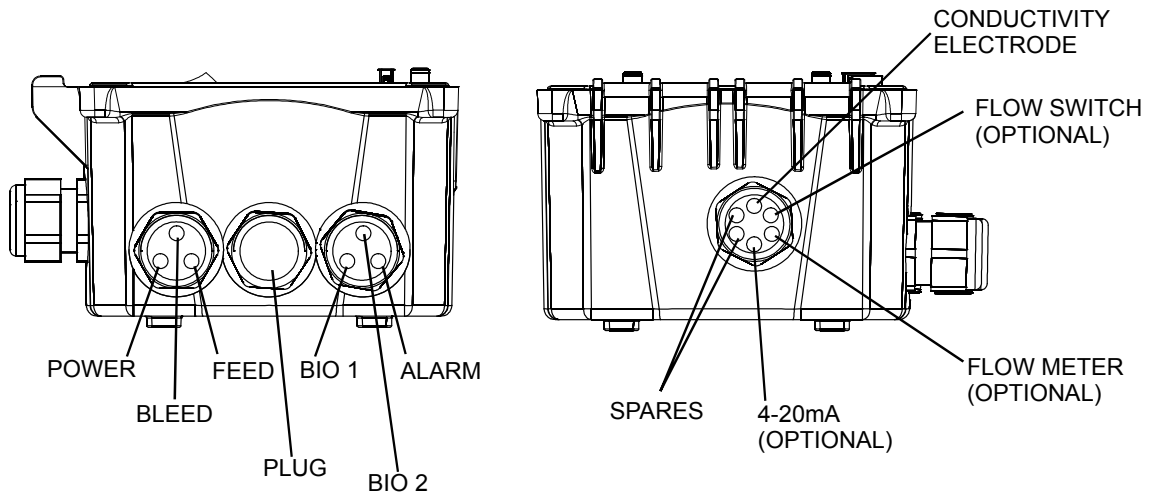
\*Class A equipment: Equipment suitable for use in establishments other than domestic, and those directly connected to a low voltage (100-240 VAC) power supply network which supplies buildings used for domestic purposes.



## WCT400/410 INPUTS



## WCT410 OUTPUTS



## WCT410 Conduit Wiring